

CASE REPORT

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Peculiar penetrating oropharyngeal foreign body accident: a case report and review of literatures

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Abstract

Background Children are curious to learn and are always explorative. This exploration is sometimes by keeping things in the oral cavity resulting in cases of foreign body in the aerodigestive tract. Penetrating oropharyngeal foreign bodies can result in significant morbidity and mortality if not treated promptly. The usual objects implicated in children are pens, pipes and toys which are cylindrical. The injury commonly occurs when the child falls with foreign body in the mouth. Here, we present a case report of a peculiar penetrating oropharyngeal foreign body accident.

Case presentation A 7-year-old boy was brought to the emergency room with an alleged history of foreign body insertion into the mouth while playing with a rigid metallic rod which was bent in the end. Following a forceful hit on the head of the child by his sibling from behind, the rod got impacted into the mouth. The screening X-ray revealed an impacted foreign body. Non-contrast computed tomography scan was done on an emergency basis. It revealed hook-shaped metallic foreign body in the oral cavity and penetrating the oropharynx at the tongue base region. The effective total length of FB was 30 cm with an embedded intraglossal component of 2.5 cm. To aid in intubation, the extraoral part of the foreign body was cut short preoperatively. C-MAC video laryngoscope was used to aid in intubation. A backup plan for emergency tracheostomy was made in case of failed intubation. The foreign body was held using Kocher's artery forceps and removed completely under endoscopic visualisation without any significant bleeding from the site of entry.

Conclusion The unusual shape, the relatively narrow space in the patient and the tongue being a vascular structure were challenges in the removal of the foreign body. Due to the hook shape, it had to be withdrawn cephalad for removal. Penetrating oropharyngeal foreign body should not be pulled out either at primary care or in the emergency room but should be referred to experienced ENT surgeons. Critical teamwork between the ENT surgeon and the anaesthetist with well-defined preoperative plans for airway management is necessary. Awareness and ensuring safe play areas for children will prevent a great deal of penetrating oropharyngeal foreign body.

Keywords Foreign body, Child, Oropharynx, Tongue, Intubation

Background

Children are curious to learn and are always explorative. This exploration is sometimes by keeping things in the oral cavity resulting in cases of foreign body (FB) in the aerodigestive tract [1, 2]. Penetrating FBs, especially in the oropharynx, can result in significant morbidity and mortality if not treated promptly. The complex anatomy of the head and neck makes it difficult to treat penetrating

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FBs. Cylindrical FBs like pens, pipes and cylindrical toys are some of the usual objects implicated in penetrating oropharyngeal foreign body (POFB) in children [3]. The role and the modality of imaging need to be decided on a case-to-case basis. POFB carry the inherent risk of neurovascular injury. Critical teamwork between the ENT surgeon and the anaesthetist with well-defined preoperative plans for airway management is essential [4, 5]. Here, we present a case report of an unusual POFB due to a peculiar mode of injury in a child.

Case presentation

A 7-year-old boy was brought to the emergency room (ER) with an alleged history of foreign body insertion into the mouth while playing with a rigid metallic rod which was bent in the end. The child presented to our centre after 7 h of the accident. There was no history of bleeding from the oral cavity, swelling in the oral cavity or difficulty in breathing. There was no loss of consciousness in the child. A detailed case history was taken to know the probable entry point of the foreign body. It was revealed that the boy was playing by keeping the curved end of the metallic rod inside the mouth. Following a forceful hit on the head of the child by his sibling from behind, the rod got impacted into the mouth. There was no other significant past or family history. The child was administered 0.5-ml tetanus toxoid intramuscular injection in the emergency room.

On examination, the child had stable vitals. There was a black metallic rod with an extraoral component measuring around 30 cm found impacted within the patient's oral cavity. He was apprehensive and irritable on attempting to do a local examination to reveal the probable location of the foreign body. On initial examination, the child was cooperative to facilitate examination only until the posterior part of the tongue. Hence, on initial clinical examination, the FB was visualised over the dorsum of the tongue in the midline, with the entry wound not being visualised. The screening X-ray (i.e. X-ray neck AP and lateral view) which was already done also revealed an impacted foreign body. However, the exact location of the FB could not be made out from the X-ray. As attempts to examine the child in the ER were futile, a non-contrast computed tomography scan (NCCT) was done on an emergency basis. It revealed a hook-shaped metallic FB entering the oral cavity through the mouth and the oropharynx at the base of the tongue region. The foreign body was embedded within the intrinsic muscles of the tongue in an anteroinferior direction, and the intraglossal component was 2.5 cm. The FB was almost close to the midline in the CT scan (Fig. 1).



Fig. 1 Demonstrating failed examination of foreign body wire in the oropharynx

A diagnosis of POFB was made, and the child underwent removal of the FB under general anaesthesia after endotracheal intubation. Informed written consent was taken from the child's parent. To aid in intubation, the extraoral part of the foreign body was cut short preoperatively. C-MAC video laryngoscope was used to aid in intubation. A backup plan for emergency tracheostomy was made in case of failed intubation. Intraoperatively, 45° rigid endoscope was used to aid in visualisation as the entry point was via one of the hidden areas of the oropharynx, i.e. base of the tongue in our case. The FB was held using Kocher's artery forceps and removed completely under endoscopic visualisation without any significant bleeding from the site of entry. The entry point

wound was cauterised. The child was given injection amoxicillin-clavulanic acid and injection metronidazole according to body weight for 3 days, and the child's postoperative period was uneventful. The child's parents counselled about safe play areas to prevent similar incidents in future. On 1-year follow-up, the child is doing well.

Discussion

Foreign bodies in otorhinolaryngology, especially in the paediatric population, can involve any part of the head and neck and are common presentations in the ER. However, POFB is a rare presentation to the ER, especially with the FB in situ [6]. A case series of 38,793 patients attending ENT emergencies by Raja A. et al. over 5 years revealed zero patients with penetrating FB describing the rarity of the case [7]. POFB in children usually occurs when the child falls with FB in the mouth [6, 8]. In our case, the child was standing with the FB in the oral cavity with a trauma to the head from behind which pushed the FB inside the oropharynx that is not very common. Had it been the former mode of injury, the chances of FB penetrating the posterior pharyngeal wall or the tonsils would have been higher. History taking formed a pivotal role in establishing the probable entry point and deciding on further evaluation. Failure to give proper history can lead to delays in diagnosis or complications [9].

The usual objects implicated in POFB in children are pens, pipes and toys that are cylindrical [3]. In our case, it was a non-malleable metallic hook-like rod which the child was holding in his mouth. The usual lengths of the POFB described in the literature are less than 20 cm [10, 11]. In our case, the effective length of the FB was little more than 30 cm increasing the difficulties in handling the patient.

In POFB injuries, the sites commonly affected are the tonsils and the soft palate. The parts like the hard palate, posterior pharyngeal wall, and tongue are less commonly affected [8]. In our case, the FB was over the tongue, piercing the base of the tongue in the region of the vallecula and embedded in the intrinsic muscles of the tongue directed anteroinferiorly. The unusual shape of the FB, the relatively narrow space in the patient and the tongue being a vascular structure were challenges in the removal of the FB. Due to the hook-shaped FB, it has to be withdrawn cephalad for removal. Had the child or the attendees attempted to pull out the FB via the oral cavity, it would have resulted in further impaction and possible injury to adjacent structures. POFB carry the inherent risk of major neurovascular injury, especially if it involves the peritonsillar space, retropharyngeal space, etc [10, 12]. For these reasons, paediatric POFB should not be pulled out either at primary care or in the ER but should

be referred to the experienced ENT surgeons [13]. The FB removal should be performed only in the operation theatre with critical teamwork between the ENT surgeon and the anaesthetist with well-defined preoperative plans for airway management similar to our case [4, 5].

X-ray is the initial line of investigation for the evaluation of the FB [5]. In cases of radio-opaque FB in the natural tracts of the body like the aerodigestive tracts, X-ray can provide the location of the same. However, in cases of penetrating FB, it is not in the natural tract anymore, and the exact location of the FB may not be evident owing to the 2-D nature of the X-ray. In such cases, CT can provide 3-D orientation and probable location of the FB [5] (Figs. 2, 3, and 4).

With the relative midline location of the FB, based on clinical examination and X-ray findings, radiologist opinion and the possibility of the artefacts in CT, it was decided to go ahead with the NCCT as there was no risk of any major blood vessel injury. In our case, risk of bleeding was expected from the tongue only. Bleeding was controlled using electrocautery at the wound site. In cases of suspected major vessel injury with increased risk of bleeding, CT scan with 3-D reconstruction should be done. CT angiography also should be considered. A vascular surgeon assistance for possible repair of the great vessel and steps for carotid artery ligation as the final resort should be considered [8].

In reports of FB embedded deep into the extrinsic muscles of the tongue, perioperative ultrasonography has also been described to be useful [14]. In our case, although the X-ray revealed the approximate location of the FB, i.e. the oral cavity and oropharynx, the extent of the same and the subsites involved could not be made out. Palate appeared to be involved in the X-ray. The inability to have a satisfactory clinical examination and inadequate X-ray finding warranted a CT scan in our case. The use of rigid oesophagoscopy and bronchoscopy has been commonly described in the literature to aid in FB removal [15]. However, the use of a 4-mm rigid endoscope intraoperatively has not been commonly described. The unique mode of injury, the unusual shape of the FB and entry point in the hidden area of the oropharynx necessitated the use of a rigid endoscope to visualise the FB removal in our case. Table 1 depicts the comparison of data in various other penetrating FB case reports.

Conclusion

Prevention is better than cure. POFB usually occurs when the child is unattended as may be the case when both the caregivers are working. In our case, the absence of adult supervision and unsafe play area led to the occurrence of POFB. Awareness and ensuring safe play areas for children will prevent a great deal of POFB. Adult supervision

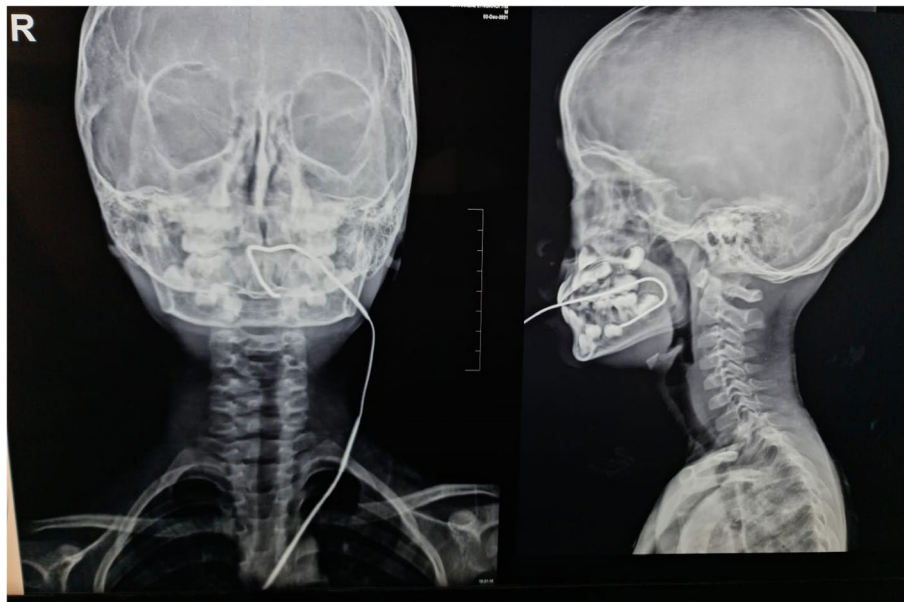


Fig. 2 Showing the anteroposterior and lateral view of the X-ray of the head and neck of the child with the foreign body in situ



Fig. 3 Showing the approximate length (> 30 cm) of the foreign body removed

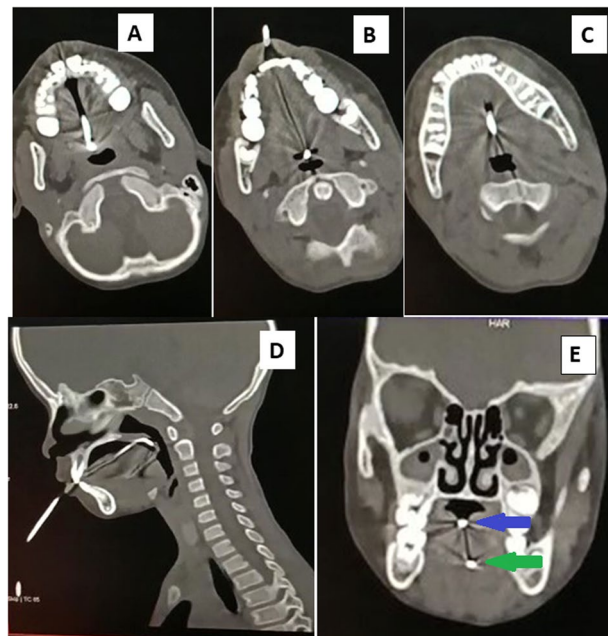


Fig. 4 **A** Axial CT image demonstrates metallic foreign body (FB) in oral cavity. **B** Demonstrates the posterior extent of the FB touching lingual surface of epiglottis. **C** Shows FB embedded in the intrinsic muscles of tongue. **D** Sagittal CT image demonstrates the complete extent of the FB superiorly abutting soft palate. **E** Coronal CT shows the extraglossal (blue arrow) and intraglossal (green arrow) components of the FB

Table 1 Comparison of different penetrating foreign body cases

	Our case report	Edem et al. [3]	Gupta et al. [9]	Lei et al. [10]
Demographic factors	7 years/male/rural region	4 years/female/rural region	10 years/male/urban	2 years/male/urban
Mechanism of trauma	Trauma to head from behind with FB inside oral cavity	Fall on the floor with the FB in oral cavity	Fighting in classroom	Fall with FB in oral cavity
Type of foreign body	Long hook-shaped metallic rod	Screw driver (straight metallic part)	Plastic ball pen cap	Chopstick with corncob
Size of foreign body	30 cm	8.5 cm	2–3 cm	-
Anatomical parts involved	Oral cavity and oropharynx (tongue base)	Hard palate, nasopharynx	Pterygomandibular space	Hard palate, nasopharynx, skull base
Radiological findings	Hook-shaped metallic FB over the dorsal surface of the tongue, penetrating tongue base with intraglossal component of 2.5 cm in CT scan	Straight metallic FB penetrating the hard palate, entered the nasopharynx impinging the skull base in X-ray	Strange cylindrical FB in left retromolar area in MRI scan	Chopstick penetrating hard palate, crossing the nasopharynx and impinging into the skull base
Difficulties in management	Unusual shape and entry point in hidden area of oropharynx	Difficulty in bag and mask ventilation and intubation	Delayed presentation of 3.5 months without direct history of FB	Potential airway compromise by the corncob

of the vulnerable children is needed. Counselling of the parents or caregivers in this regard is of paramount importance. However, the same cannot be implemented in low-income settings due to financial constraints, wherein the parents who are daily wage labourers need to take the children to work instead of leaving them unattended at home.

Abbreviations

FB	Foreign body
ER	Emergency room
NCCT	Non-contrast computed tomography scan
POFB	Penetrating oropharyngeal foreign body

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Authors' contributions

MCB collected clinical materials and drafted the article after literature search. ZL helped in drafting the article and proofread the article. PT helped in article drafting and proofreading the article and collection of clinical and radiological images. AD helped with collection of clinical materials and patient follow-up. All the authors have read and agreed to the contents.

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Availability of data and materials

This is a case report, and all the data pertaining to the case report have been included in this published article.

Declarations

Ethics approval and consent to participate

This is a case report, and case reports are exempted from the Institute Ethics Committee, NEIGRIHMS, Shillong. The article was prepared in accordance with the Declaration of Helsinki. Written informed consent was obtained prior to publication of the case report from the patient's parent.

Consent for publication

Written informed consent for publication of the patient's clinical details and clinical images was obtained from the patient's parent.

Competing interests

The authors declare that they have no competing interests.

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